

IN THE CLAIMS:

Claims 1 – 14 (cancelled)

15. (new) A system for powering an electric motor, comprising:

an electronic drive unit having a power input and a power output for connection to an electric motor, said drive unit including circuits having semiconductor components with performance characteristics that are enhanced at temperatures below ambient, said power output of said drive unit being compatible with performance requirements of said electric motor;

an electrical power generator system electrically connected to and supplying power to said electronic drive circuit power input; and

a refrigeration unit thermally connected to said drive unit to cool said circuits with semiconductor components below ambient temperature and to enhance performance.

16. (new) A system as in Claim 15, further comprising:

an electric motor having controllable output and performance requirements, cooling said motor enhancing its operating performance, said drive unit power output having an electrical connection to said electric motor to power said motor,

said refrigeration unit being thermally connected to said electric motor to cool said motor and enhance motor performance.

17. (new) A system as in Claim 16, further comprising at least one electrical power buss for said electrical connection between said motor and said electronic drive unit, at least a portion of said buss including a conductor having enhanced performance at

temperatures below ambient, said refrigeration unit being thermally connected to said power buss to cool said buss and enhance buss performance.

18. (new) A system as in Claim 17, wherein at least one of said motor and buss includes components constructed of superconducting materials, and said refrigeration unit provides cryogenic cooling temperatures to maintain said components of superconducting materials operating in a superconductive state, system performance being enhanced thereby.

19. (new) A system as in Claim 16, wherein said electrical power generation system includes an oxygen/hydrogen fuel cell.

20. (new) A system as in Claim 19, wherein said refrigeration unit includes a tank containing one of hydrogen and liquid natural gas to provide hydrogen fuel to said fuel cell and to serve as a coolant.

21. (new) A system as in Claim 20, wherein said tank is contained within an enclosure containing liquid nitrogen.

22. (new) A system as in Claim 20, wherein said motor includes at least one of coils and windings of superconducting material, said motor being cryo-cooled via cold pipes connected between said tank and said motor, said tank content being at cryogenic temperature to maintain said coils and windings in a superconducting state.

23. (new) A system as in Claim 21, wherein said motor includes at least one of coils and windings of superconducting material, said motor being cryo-cooled via thermal connection between said motor and at least one of said tank and enclosure, content of said connected tank/enclosure being at cryogenic temperature to maintain said coils and windings in a superconducting state.

24. (new) A system as in Claim 20, wherein said motor includes at least one of coils and windings of superconducting material, said motor being cryo-cooled via thermal connection between said tank and said motor, said tank content being at cryogenic temperature to maintain said coils and windings in a superconducting state.

25. (new) A system as in Claim 18, wherein said buss includes a flow passage for cold fluid from said refrigeration unit.

26. (new) A system as in Claim 15, wherein said electronic drive unit includes semiconductor switches, capacitors, superconducting inductor coils, said semiconductor switches including cryo-MOSFETs, cryo-IGBTs, cryo-IGCTs, and cryo-MTOs, said refrigeration unit providing cooling at cryogenic temperatures.
27. (new) A system as in Claim 20, wherein said tank contains liquid natural gas, said liquid natural gas being delivered to said fuel cell by way of tubes and a reformer generating hydrogen from said liquid natural gas.
- 28.(new) A system as in Claim 20, wherein said tank contains liquid hydrogen, said electronic drive unit being positioned in a temperature environment maintained by said liquid hydrogen between 20K and 200K.
29. (new) A system as in Claim 20, wherein said electronic drive unit is sealed in a container, said container being immersed in said tank, said tank containing liquid natural gas.
30. (new) A system as in Claim 20, wherein said tank is thermally connected to said electronic drive unit by cold fingers, said drive unit being cooled by heat conduction along said fingers.
31. (new) A system as in Claim 16, wherein said motor connects to a wheel for rotation thereof.
32. (new) A system as in Claim 31, further comprising at least one additional electronic drive unit connected electrically to one additional motor and wheel, said additional electronic drive unit being connected to said electrical power generation system.